84-086

(20)

INTERSPIRO

December 23, 1987

Director
Division of Safety Research
NIOSH
944 Chestnut Ridge Road
Morgantown, WV 26505

RE: 42 CFR Part 84, Notice of proposed rulemaking

Dear Sir:

Interspiro is pleased to submit the enclosed comments and recommendations to the Notice mentioned above.

If you have any questions or need further information, please do not hesitate to contact us.

Please inform us as to the time and place of the public hearings in this matter.

Sincerely,

Hans O. Almqvist
President

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HOA:jh
enclosures

VIA FEDERAL EXPRESS

Copy of Fed Reg Sent Vol 52 No. 195 12/31/87

a Pharos company

Interspiro, Inc.
11 Business Park Drive
Branford, CT 06405
(203) 481-3899

Respirator Testing

Ref. Subpart D, Sections 84.30 through 84.34

Comment: Regarding the "workplace or simulated workplace testing", we conclude that:

--this test is expensive, which will add considerably to the cost of the respirator;

--it is unclear if a respirator intended for the fire service and hazardous materials handling shall be tested in a mine or an environment more related to fire department and industrial use;

--the guidelines leave open many alternative interpretations regarding test conditions and test performance.

Recommendation: The standard should include more specific rules as regards "workplace conditions" and referrals to a manufacturer-independent laboratory with appropriate testing facilities; preferably, a non-profit organization operating in the public interest.

Minor Subjects

Section 84.11(d)

It seems to us that a minimum of four respirators would be needed, should NIOSH decide to perform its own tests (Section 84.248-12-13).

Section 84.220(i)

The term "resistant" may have to be defined more explicitly.

Section 84.232(e)

The stated 10% linearity requirement on the aerosol detector is probably very difficult to achieve when respirators are tested for the highest protection factors. Some advice regarding alternative measuring procedures would be of considerable value to manufacturers.

Section 84.240(a)

"Enriched air" could possibly be added as part of the breathing gases.

Section 84.244(g)

The rule for determining the maximum escape of air for open-circuit respirators is unclear to us. A possible solution would be to specify a maximum leakage in liters per minute when measured at 25 percent of the service pressure.

Section 84.248-3(c)

The reference should be made to footnote 3 rather than footnote 1.

Section 84.248-7(a)(4)

The reference to paragraph (e) is not clear to us.

Section 84.248.17(e) and (f)

We feel that the tightness test using negative pressure is inadequate for any full facepiece intended for use with a positive pressure regulator. In this case, the seal should prevent major escape of breathing gas to the surroundings, which cannot be demonstrated by a negative pressure test.

We suggest that a visual inspection of the sealing surface before and after the flame test should be considered sufficient for positive pressure types of respirators.

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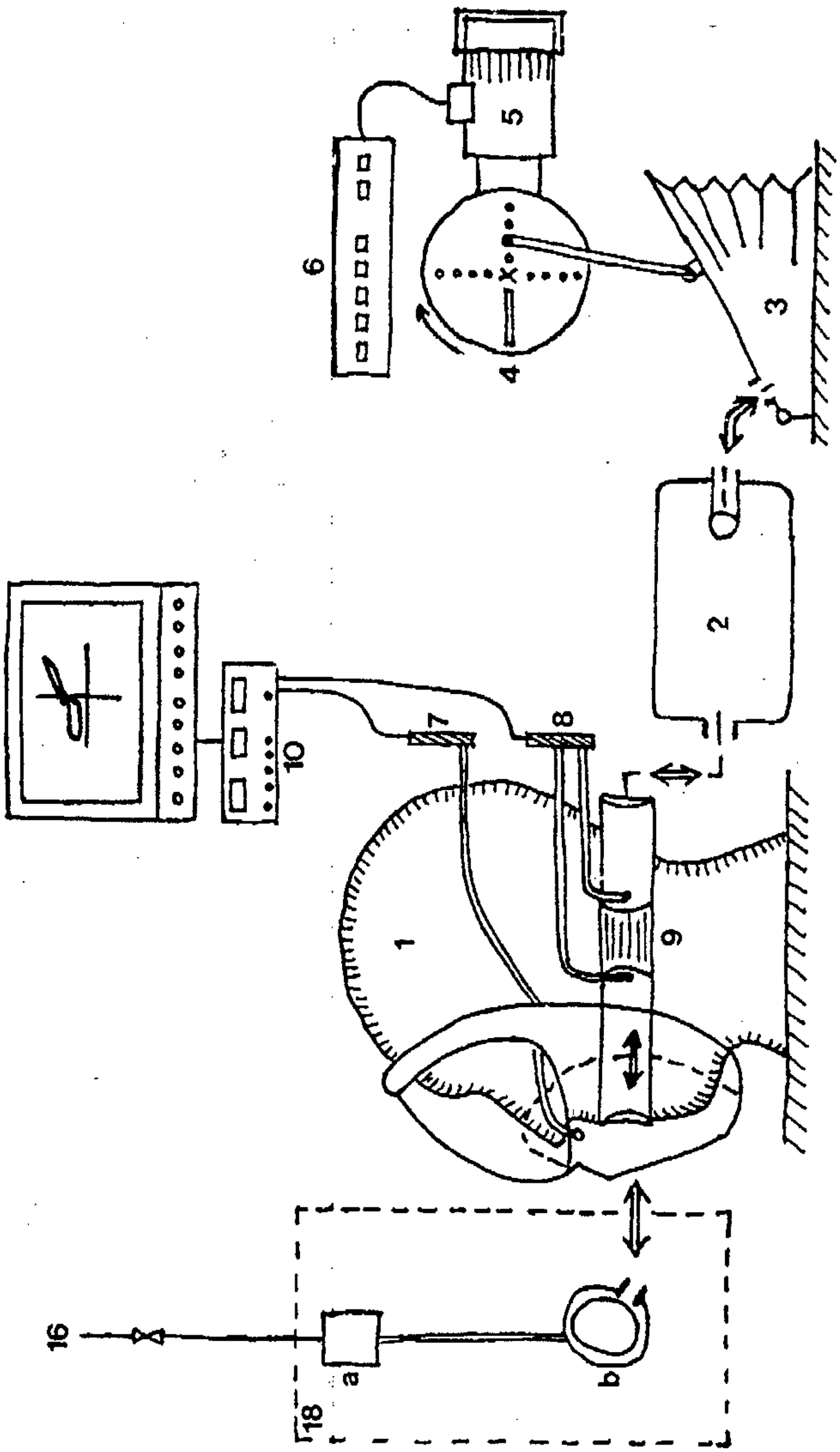
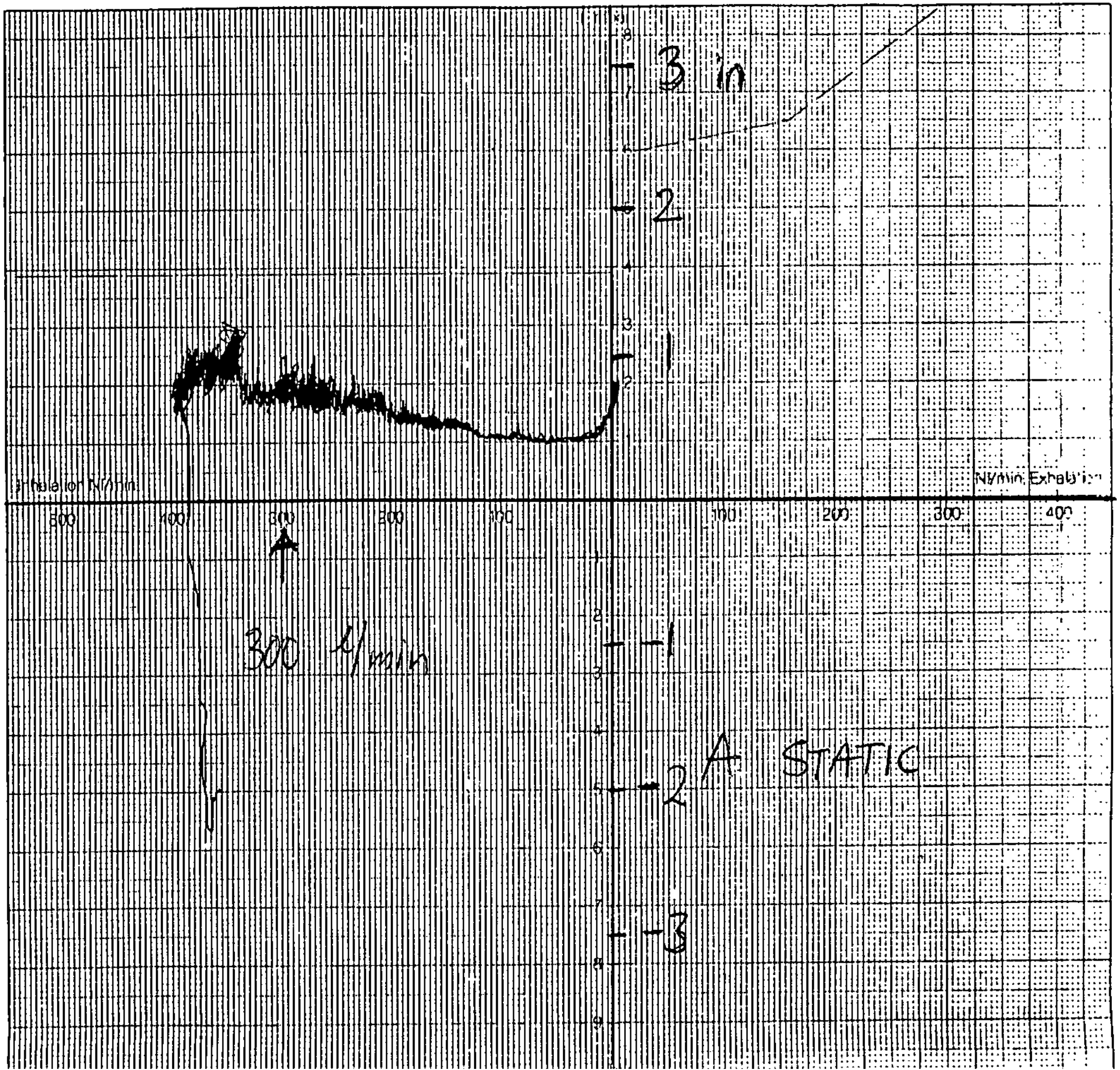


Spirograph test-sheet

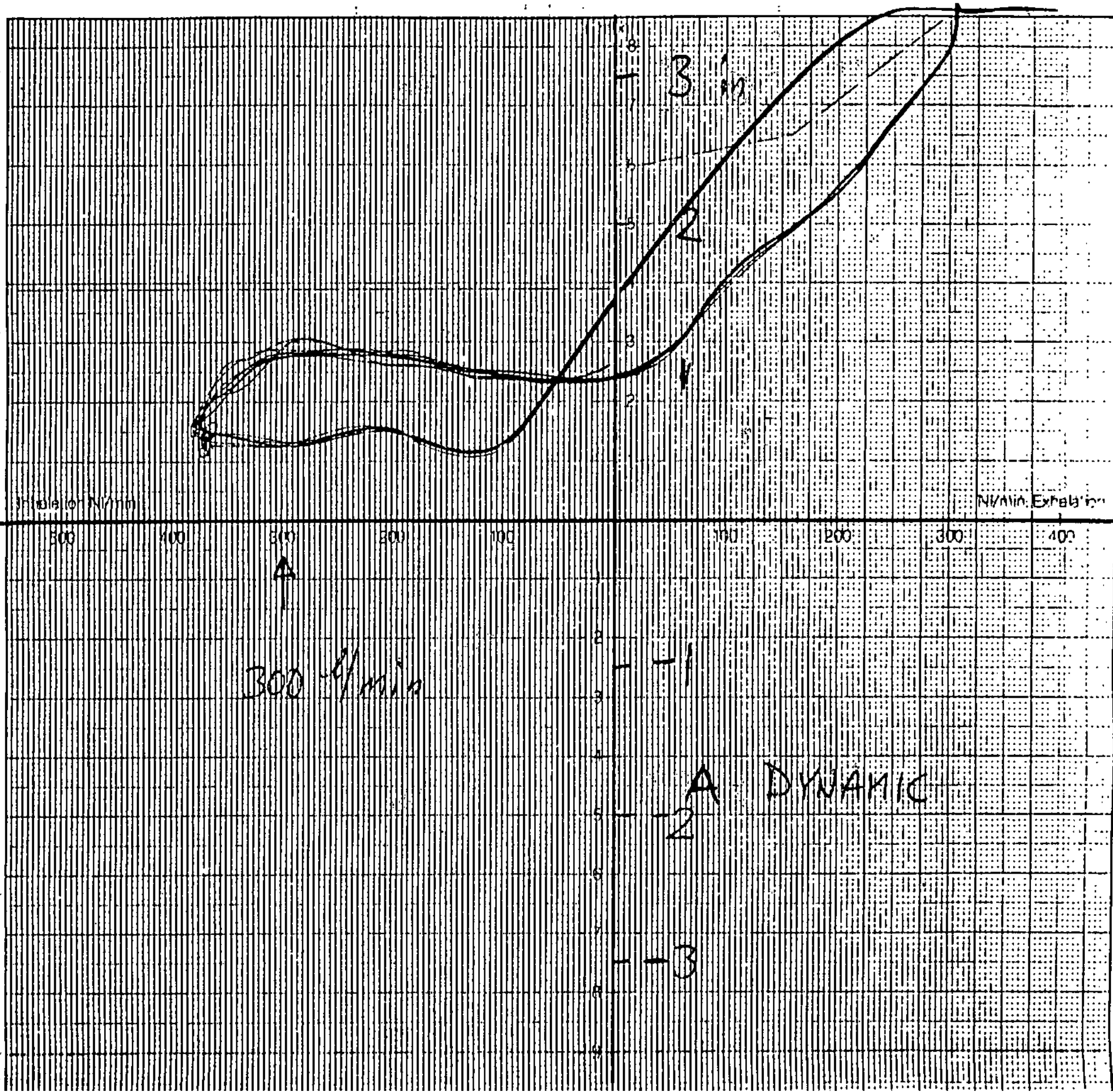
maier Atemschutztechnik



IS II

Spirograph test-sheet

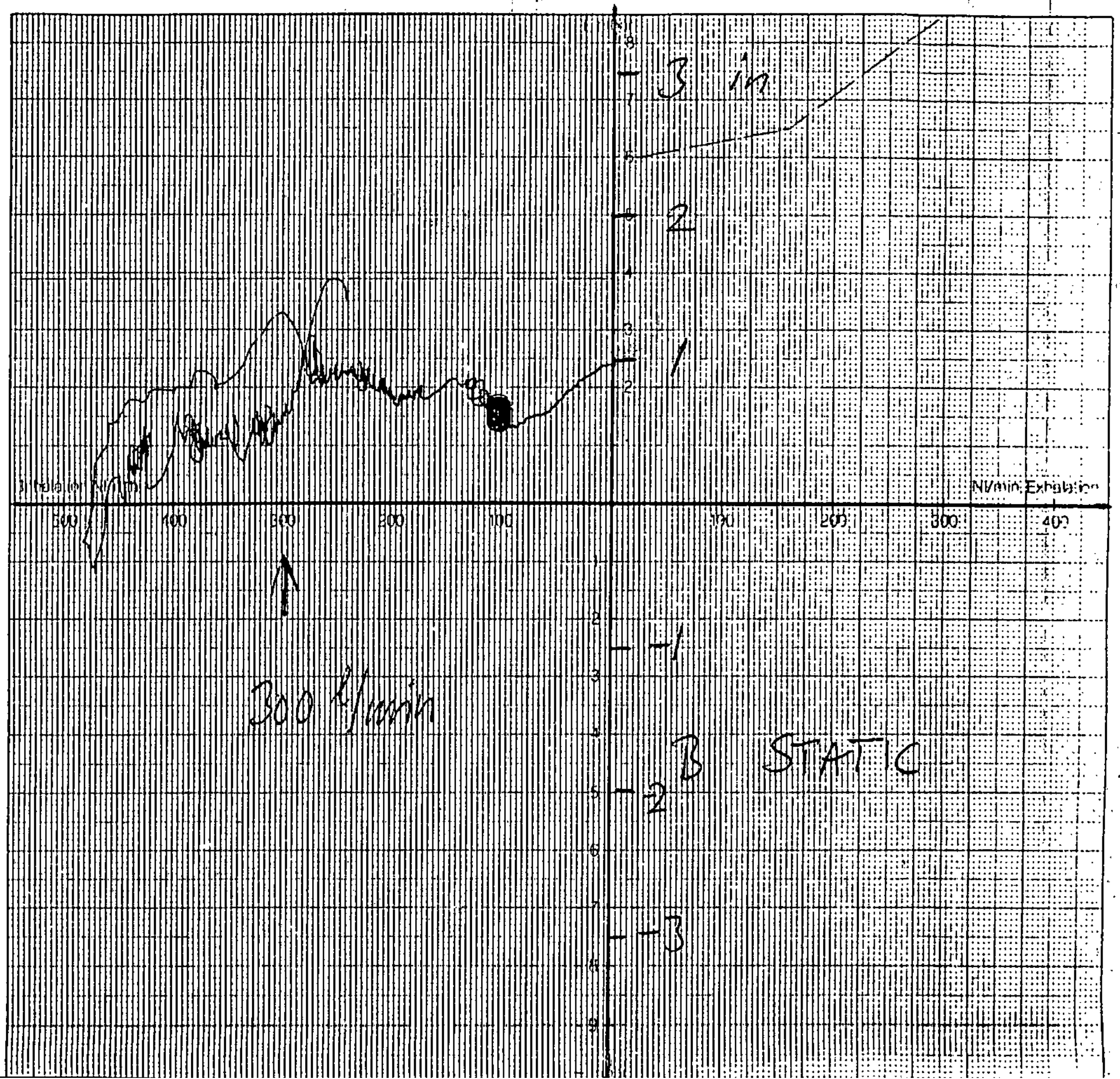
Atemschutztechnik



IS III

Spirograph test-sheet

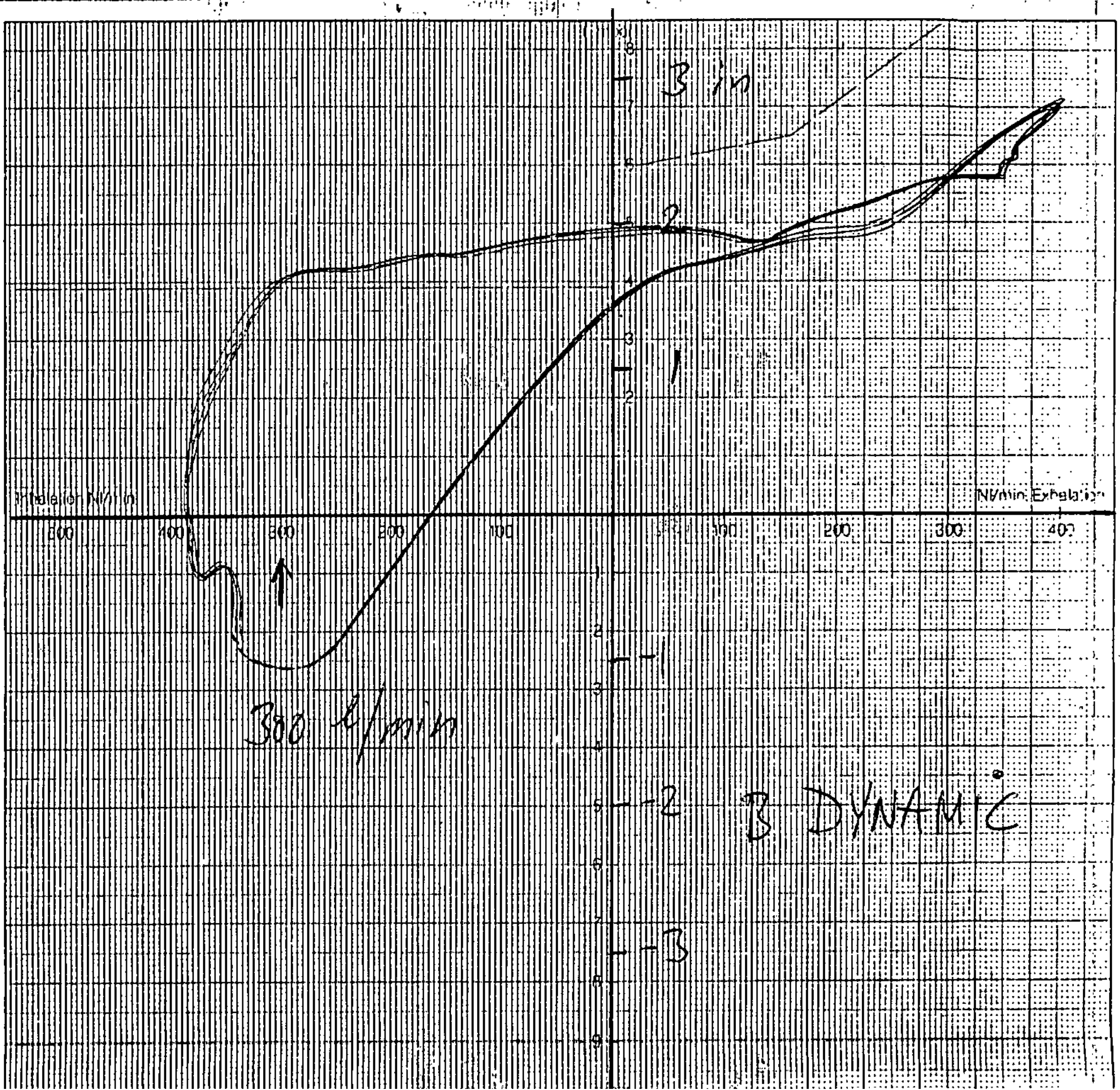
maler Atemschutztechnik



IS IV

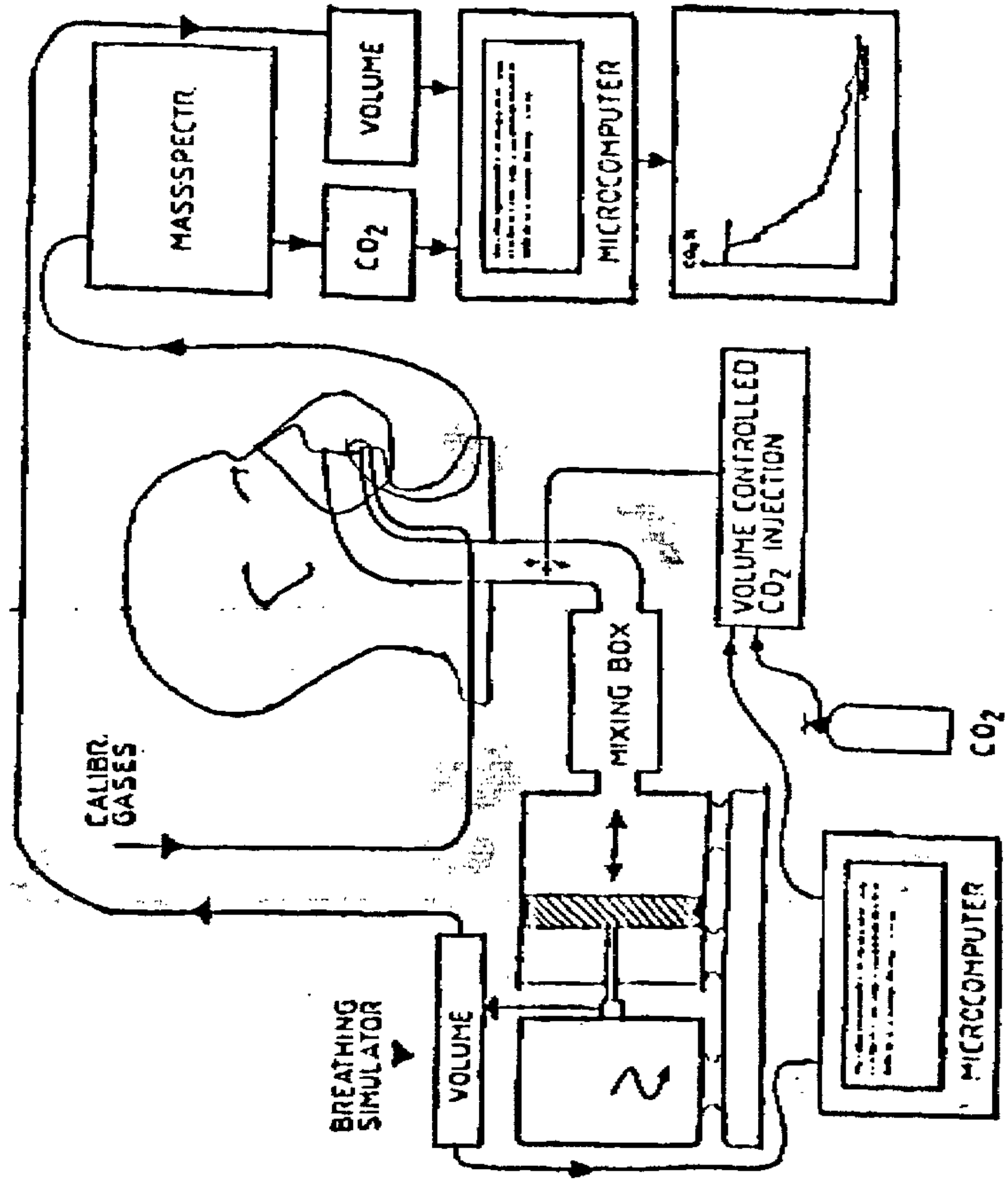
Spirograph test-sheet

malter Atemschutztechnik



IS V

IS VI


MASSSPECTR.
VOLUME
CO_2
MICROCOMPUTER
VOLUME CONTROLLED
CO_2 INJECTION
MIXING BOX
CALIBR.
GASES
CO_2
BREATHING
SIMULATOR
VOLUME
MICROCOMPUTER

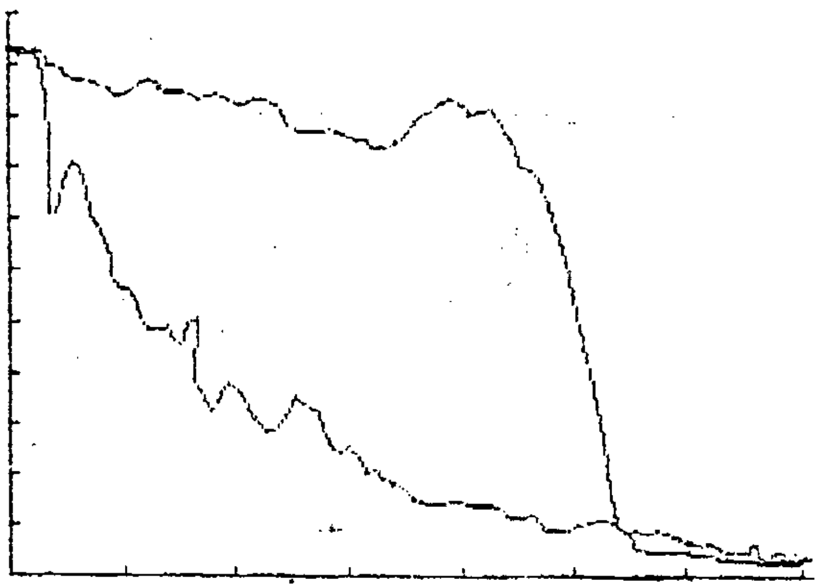
IS VII

Dead space measurements

Filename: [redacted]
Samples : 84 - 340
Date : 1986-JAN-16
Test number : 1
Gasmixture : Air
Depth : Atmospheric pressure
Test conditions : 10.5 l/min
The CO2-signal was delayed 16 samples

Unit A
10.5 l/min

kPa CO2, 0.5 kPa per division



Volume, 0.1 litre per division

Calculations :

Tidalvolume .7 l ATP
Endtidal CO2 5.2 kPa (= 5.2 %)
Inspired volume of CO2 9.7 ml ATP
Average inspired CO2 1.4 kPa (= 1.4 %)
External dead space .19 l ATP

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Advanced Underwater Technology AB
Göteborg, Sweden

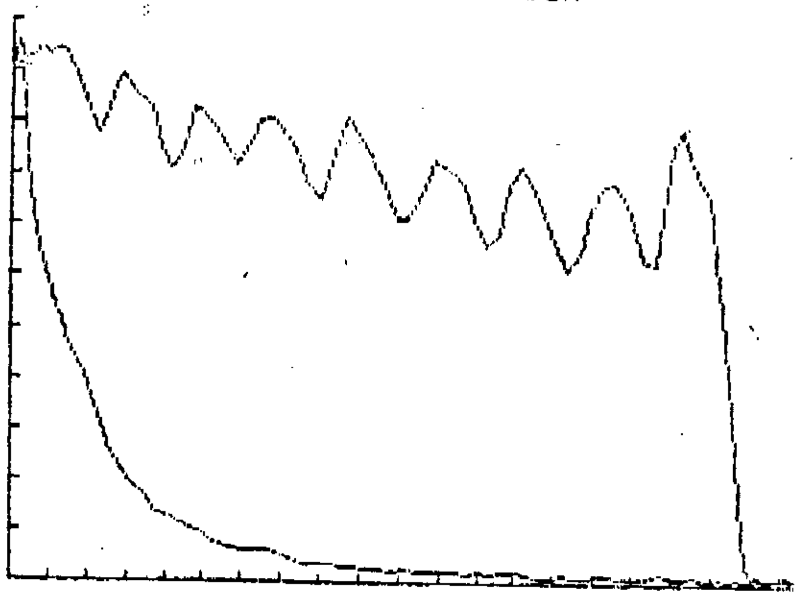
IS VIII

Dead space measurements

Unit A
40 l/min

Filename: [redacted]
Samples : 29 - 228
Date : 1985-OCT-09 10.56.28
Test number : 2
Gasmixture : Air
Depth : Atmospheric pressure
Test conditions : [redacted] 20±2.0
The CO2-signal was delayed 13 samples

kPa CO2. 0.5 kPa per division



Volume, 0.1 litre per division

Calculations :

Tidalvolume 2 l ATP
Endtidal CO2 5.1 kPa
Inspired volume of CO2 10.6 ml ATP
Average inspired CO2 .53 kPa
External dead space .21 l ATP

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Advanced Underwater Technology AB
Göteborg, Sweden

IS IX

Unit B

10.5 l/min

Filename: [redacted]
Samples : 600 - 850
Date : 1986-JAN-17
Test number : 17
Gasmixture : Air
Depth : Atmospheric pressure
Test conditions : [redacted]
The CO2-signal was delayed 16 samples

kPa CO2, 0.5 kPa per division

Volume, 0.1 litre per division

Calculations :

Tidalvolume .7 l ATP
Endtidal CO2 5.1 kPa (= 5.1 %)
Inspired volume of CO2 11.8 ml ATP
Average inspired CO2 1.7 kPa (= 1.7 %)
External dead space .23 l ATP

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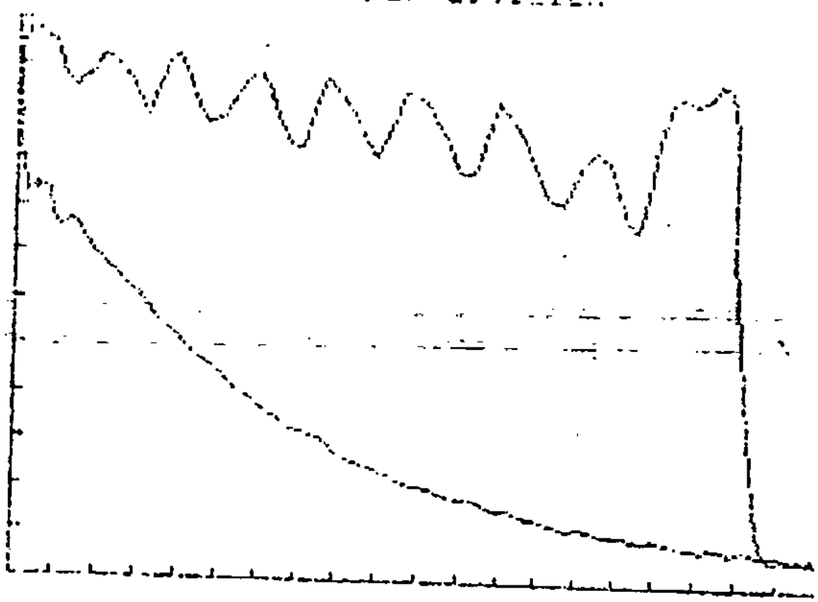
Advanced Underwater Technology AB
Göteborg, Sweden

IS X

Dead space measurements

Filename: [redacted]
Samples : 255 - 450
Date : 1985-OCT-09 18.39.16
Test number : 20
Gasmixture : Air
Depth : Atmospheric pressure
Test conditions : [redacted] : 20*2.0
The CO2-signal was delayed 13 samples

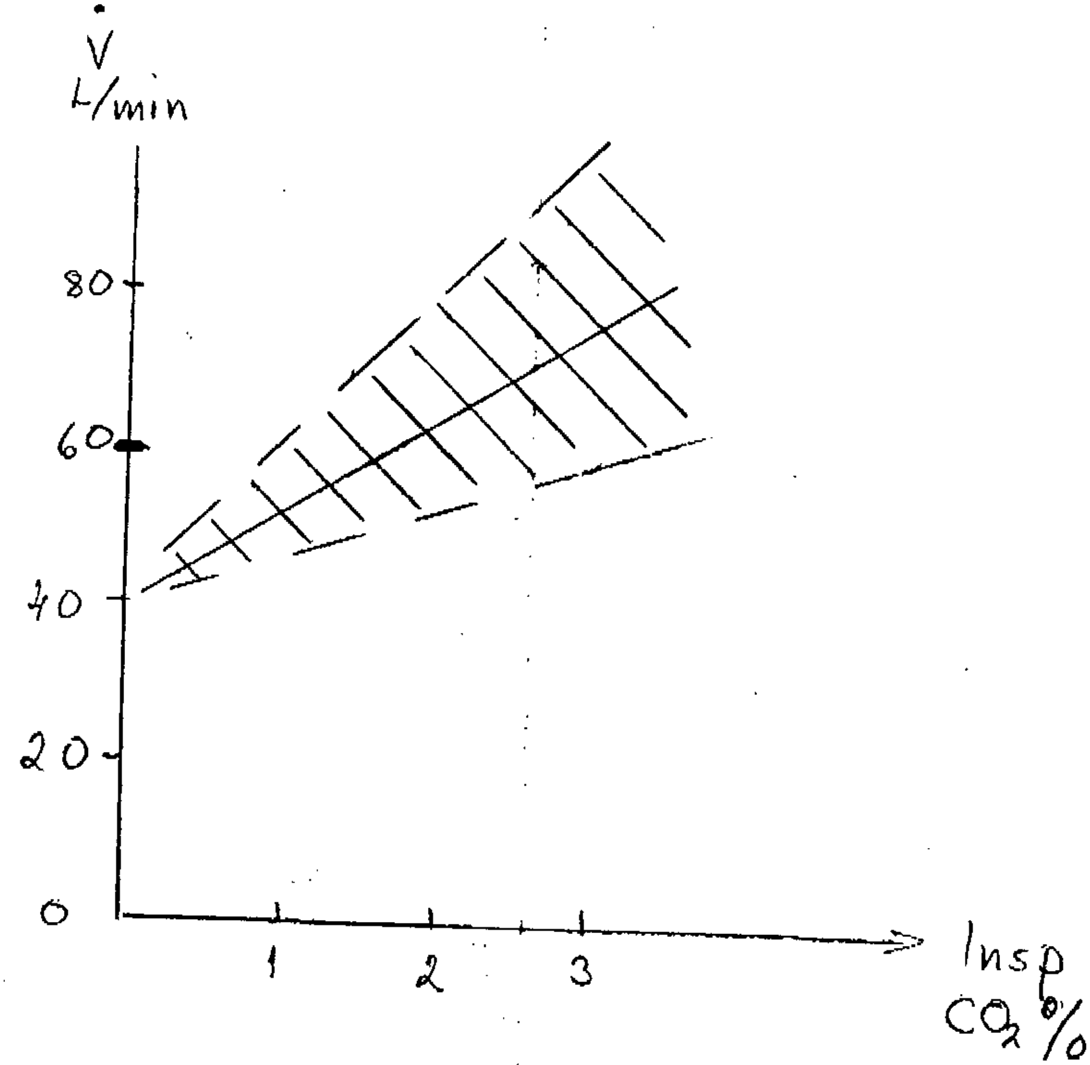
Unit B
40 l/min



Calculations :

Tidalvolume 2 l ATP
Endtidal CO2 5.8 kPa
Inspired volume of CO2 29 ml ATP
Average inspired CO2 1.47 kPa
External dead space .5 l ATP

Advanced Underwater Technology AB
Goteborg, Sweden



Sources: Respiration and Circulation
Ed.: P.L. Altman and D.S. Dittmer
Fed. o Am Soc for Experimental Biology
Bethesda Md 1971

C. Malmsten, Mats Rosander
Rök- och kemdykning
Sv. Brandförsvarsfören 1987